Wisconsin
Department of Commerce

Approval # 20020009
(Replaces 970073-U)

Environmental & Regulatory Services Division
Bureau of Petroleum Products and Tanks
201 West Washington Avenue
P.O. Box 7837
Madison, WI 53707-7837

Wisconsin COMM 10 Material Approval

Equipment: PISCES Nonmetallic Underground Secondary Containment Piping System and Stainless Steel Flexible Connectors

Manufacturer: OPW Fueling Components
P.O. Box 405003
Cincinnati, OH 45240-5003

Expiration of Approval: December 31, 2007

SCOPE OF EVALUATION

The PISCES underground piping system as manufactured by OPW Fueling Components, was evaluated for use as petroleum product piping for underground storage tank systems in accordance with **Comm 10.51 (2)**, of the Wisconsin Administrative Flammable and Combustible Liquids Code.

The stainless steel flexible connector as manufactured for OPW Fueling Components by Flex-Pressions Ltd. of St. Laurent, Quebec, Canada, was evaluated for use as petroleum product piping for underground storage tank systems in accordance with **Comm 10.51 (2)**, of the Wisconsin Administrative Flammable and Combustible Liquids Code.

DESCRIPTION AND USE

The PISCES primary flexible piping system includes a primary pipe that consists of an inner tube of Kynar™, a polyester yarn reinforcement layer and backing, and a non-permeable nylon outer layer, and is available in 1.5-in. and 2-in. sizes with or without integral secondary containment (double-wall). Secondary containment capability is provided either by jacketing the primary pipe with a polyethylene stand-off layer that is fabricated to produce an interstitial space (double-wall), or by installing the jacketed version in the Pisces access/secondary containment pipe. The access pipe has a smooth inside wall that is intended to improve leak detection capability and liquid recovery, and to allow the primary pipe to be retracted for inspections, repairs, or replacement, without excavation, and is available in 2-in., 3-in., and 4-in. sizes.

The stainless steel flexible connector dampens the effect of ground and/or piping movement, and is used for connecting piping to pumps and dispensers; and for providing splice connections and changes of direction throughout the piping system and is available in 1-in., 2-in., and 3-in. sizes.

TESTS AND RESULTS

PISCES flexible piping was found to comply with the current Underwriters Laboratories' requirements for this class of piping and is suitable for use in the distribution of petroleum products, alcohols, and alcohol-gasoline mixtures.

The stainless steel flexible connector products have all been tested and listed to the appropriate UL Standard and are eligible for UL Follow-Up Service.

LIMITATIONS / CONDITIONS OF APPROVAL

PISCES Flexible Piping

- PISCES primary flexible piping is approved as meeting the design and construction standards for underground piping as specified in **s. Comm 10.51 (2)** up to 75 psig.

- Critical performance parameters for the PISCES flexible piping:

Primary Pipe

PISCES Pipe Size (in.)	Minimum Bend Radius (in.)	Terminating Fitting Bend radius (in.)[1]	Bulk Modulus[2] (psi)
1 ½	24	24	6951
2	24	24	6951

[1]: As measured in a horizontal plane into the tank or dispenser sump basin.
[2]: Calculated value assuming 73.4°F, nominal wall thickness, 50-year creep allowance, no contribution from barrier layer.

Access/Secondary Containment Piping

PISCES Pipe Size (in.)	Minimum Bend Radius (in.)	Terminating Fitting Bend radius (in.)[1]	Bulk Modulus[2] (psi)
2	24	24	N/A
3,4	36	36	N/A

[1]: As measured in a horizontal plane into the tank or dispenser sump basin.
[2]: The Access piping is for secondary containment only, a bulk modulus value is not necessary for this application.

- PISCES flexible piping is approved for installation without the flex connectors specified in **s. Comm 10.51 (2)(e)**.

- PISCES flexible piping is approved for underground (buried) installations only. A maximum of 3 inches of low melting point materials may be exposed at the point where the piping enters a sump.

- The PISCES secondary containment jacket and access/secondary containment piping is approved for use as a secondary barrier for interstitial monitoring systems in compliance with **s. Comm 10.61 (7).**

- Installation, use and maintenance of all products shall be in accordance with the manufacturer's recommendations and this approval. In the event of conflicts, the stricter requirement shall govern.

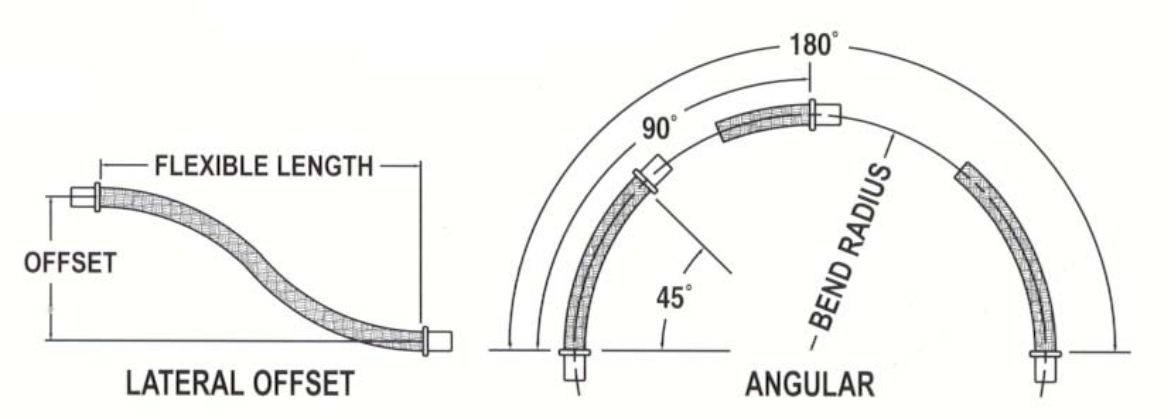
- Leak detection for the piping system shall be provided in accordance with **s. Comm 10.60 (2)**. The specific leak detection system must be shown on the plans that are submitted for review in accordance with **s. Comm 10.10**. Automatic line leak detectors and line tightness testing methods must be specifically approved for use with flexible piping in accordance with **s. Comm 10.125**. (Note: Evaluation of these leak detection methods with the standard EPA protocol does not demonstrate acceptability for use with flexible piping.)

Stainless Steel Flexible Connectors

- The OPW stainless flexible connectors as manufactured by Flex-Pressions Ltd. of St. Laurent, Quebec, Canada, are approved for underground use (buried) and for use in unburied underground locations such as connection to submersible pumps in manways or shutoff valves at the base of dispensers. These connectors are also approved for use in aboveground piping systems that are protected from physical damage.

- Corrosion protection is required for all flexible connectors in accordance with **s. Comm 10.51 (2)(b)**. This can be accomplished by isolating the connector from soil contact; or by providing cathodic protection through the use of impressed current or sacrificial anode systems.

- Critical performance parameters for the stainless steel flexible connector (refer to the sketches for the respective measurements):



MALE x MALE or **MALE SWIVEL x MALE**[1,2]

			Max. Angular Bending (Deg.)		Max. Lateral Offset (in.)		Min. Bend Radius (in.)	
Thread Size (in.)	Length (in.)	Hose O.D. (in.)	Static Position	Intermittent Flexing	Static Position	Intermittent Flexing	Static Position	Intermittent Flexing
1.5	14	2.25	90	35	1.5	0.75	4	11
1.5	18	2.25	150	55	4.0	1.50	4	11
1.5	24	2.25	180	85	8.0	2.75	4	11
1.5	30	2.25	180	115	12.0	2.75	4	11
2	14	2.72	75	30	1.5	0.60	5	12
2	18	2.72	120	50	3.0	1.50	5	12
2	24	2.72	180	75	7.0	3.0	5	12
2	30	2.72	180	105	12.0	3.0	5	12
3	18	3.97	70	35	2.0	1.0	8	16
3	24	3.97	110	55	4.8	2.5	8	16
3	30	3.97	155	75	8.0	4.0	8	16
3	36	3.97	180	100	12.0	4.0	8	16

1: Male Swivel x Male is not available in the 3-in. size.
2: Maximum working pressure 150 psig.

This approval will be valid through December 31, 2007, unless manufacturing modifications are made to the product or a re-examination is deemed necessary by the department. The Wisconsin Material Approval Number must be provided when plans that include this product are submitted for review.

DISCLAIMER

The Department is in no way endorsing or advertising this product. This approval addresses only the specified applications for the product and does not waive any code requirement unless specified in this document.

Reviewed by: _____

Greg Bareta, P. E.
Engineering Consultant
Bureau of Petroleum Products and Tanks

Approved by: _____ Date: _____